



DEPARTMENT OF BIOLOGY, COLLEGE OF SCIENCE
UNIVERSITY OF THE PHILIPPINES BAGUIO

*Iskolar ng Bayan Building, University of the Philippines Baguio, Baguio City 2600
Fax/Tel. No. (074) 444-3128, (074) 442-7231*

CRE 230: GIS and Mapping for Ecology

COURSE SYLLABUS

1st SEMESTER | AY 2025-2026

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APPROVED ACADEMIC CALENDAR

UNIVERSITY OF THE PHILIPPINES BAGUIO PROPOSED ACADEMIC CALENDAR ACADEMIC YEAR 2025-2026



Office of the Secretary
of the University and of
the Board of Regents
**OFFICIAL
RELEASE**

Date: 11 MAR 2025

As of 18 February 2025	FIRST SEMESTER (Aug – Dec 2025)	SECOND SEMESTER (Jan – May 2026)	MIDYEAR (June – July 2026)
Deadline for filing application for transfer, appeal for readmission and extension for MRR	20 Jun, Fri	01 Dec, Mon	
ADVANCE REGISTRATION OF FIRST YEAR STUDENTS	09 Jul, Wed – 11 Jul, Fri		
Removal examination period	21 Jul, Mon – 01 Aug, Fri	18 Dec, Thu – 09 Jan, Fri	27 May, Wed – 08 Jun, Mon
Validation for advanced credits	21 Jul, Mon – 19 Aug, Wed	18 Dec, Thu – 21 Jan, Wed	27 May, Wed – 16 Jun, Tue
UP College Admission Test (UPCAT)	02 Aug, Sat – 03 Aug, Sun		
Faculty Orientation	01 Aug, Fri		
GENERAL REGISTRATION			09 Jun, Tue
Graduating students (4 th , 5 th , 6 th Year etc.)	04 Aug, Mon, a.m.	12 Jan, Mon, a.m.	
All others	04 Aug, Mon, p.m. – 06 Aug, Wed	12 Jan, Mon, p.m. – 14 Jan, Wed	
Last day of registration	05 Aug, Wed	14 Jan, Wed	
START OF CLASSES	07 Aug, Thu	15 Jan, Thu	10 Jun, Wed
WELCOME ASSEMBLY FOR FIRST YEAR STUDENTS	11 Aug, Mon		
Deadline for Change of Matriculation	15 Aug, Fri	23 Jan, Fri	11 Jun, Thu
Deadline for filing application for graduation	28 Aug, Thu	05 Feb, Thu	15 Jun, Mon
UP Foundation Day			18 Jun, Thu
Deadline for Colleges to submit to OUR tentative list of candidates for graduation	04 Sept, Thu	12 Feb, Thu	22 Jun, Mon
MID-SEMESTER	08 Oct, Wed	14 Mar, Sat	26 Jun, Fri
Wellness Break	28 Oct, Tue – 30 Oct, Thu	30 Mar, Mon – 01 Apr, Wed	
DEADLINE FOR DROPPING SUBJECTS	10 Nov, Mon	17 Apr, Fri	06 Jul, Mon
DEADLINE FOR FILING LEAVE OF ABSENCE	18 Nov, Tue	29 Apr, Wed	08 Jul, Wed (for enrolled students only)
Curriculum Committee Meeting	24 Nov, Mon	20 Apr, Mon	
UP Baguio Foundation Day	02 Dec, Tue		
END OF CLASSES	03 Dec, Wed	16 May, Sat	14 Jul, Tue
Integration Period	04 Dec, Thu	18 May, Mon	
FINAL EXAMINATIONS	05 Dec, Fri – 12 Dec, Fri		16 Jul, Thu – 17 July, Fri
Graduating students		19 May, Tue – 21 May, Thu	
Other students		19 May, Tue – 26 May Tue	
Paskihasan	12 Dec, Fri		
Araw ng Parangal and Community Lunch	15 Dec, Mon		
DEADLINE FOR SUBMITTING GRADES	20 Dec, Sat		22 Jul, Wed
Graduating students		29 May, Fri	
Other students		03 Jun, Wed	
Last day for graduating students to file permit for completion/removal	09 Jan, Fri		31 Jul, Fri
Last day for graduating students to submit requirements for academic deficiencies (INCs/4.0s) incurred in previous semesters	09 Feb, Mon	04 Jun, Thu	14 Sept, Mon
Last day for faculty to submit grades of graduating students who cleared their academic deficiencies (INCs/4.0s) incurred in previous semesters	16 Feb, Mon	11 Jun, Thu	21 Sept, Mon
College Faculty Meeting to approve candidates for graduation	16 Feb, Mon	11 Jun, Thu	21 Sept, Mon
Deadline for Colleges to submit APPROVED list of candidates for graduation	19 Feb, Thu	17 Jun, Wed	23 Sept, Wed
UNIVERSITY COUNCIL MEETING	23 Feb, Mon	19 Jun, Fri	28 Sept, Mon
BOR MEETING TO APPROVE GRADUATION	Per BOR schedule	Per BOR schedule	Per BOR schedule
COMMENCEMENT EXERCISES		30 Jun, Tue	

HOLIDAYS IN ACADEMIC YEAR 2025-2026			
2025		2026	
Ninoy Aquino Day	21 Aug, Thu	New Year's Day	01 Jan, Thu
National Heroes Day	25 Aug, Mon	Chinese/Lunar New Year	17 Feb, Tue
Baguio Charter Day	01 Sept, Mon	Masunday Thursday	02 Apr, Thu
Commemoration of the 1986 Sigat Peace Talks	13 Sept, Sat	Good Friday	03 Apr, Fri
All Saints Day Eve	31 Oct, Fri	Black Saturday	04 Apr, Sat
All Saints Day	01 Nov, Sat	Araw ng Kagitangan	09 Apr, Thu
Bonifacio Day	30 Nov, Sun	Labor Day	01 May, Fri
Feast of the Immaculate Conception of Mary	08 Dec, Mon	Independence Day	12 Jun, Fri
Christmas Eve	24 Dec, Wed	Cordillera Day	15 Jul, Wed
Christmas Day	25 Dec, Thu	Eid al-Fitr	as per official declaration
Rizal Day	30 Dec, Tue	Eid al-Adha	as per official declaration
Last Day of the Year	31 Dec, Wed		

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ABOUT UP BAGUIO

The University of the Philippines (UP) was founded in 1908 with its first campus in Manila. Its foundation was then followed soon after by the establishment of constituent units (CUs) and campuses that are strategically located all over the country. In over a century, UP has established eight constituent Universities from its 17 campuses.

The University of the Philippines Baguio (UP Baguio) began as the University of the Philippines College of Baguio (UPCB) (among the growing number of UP campuses in the Philippines), UPCB was established through the initiative of UPCB Alumni in Baguio, Benguet in 1961. UP Baguio became the 7th constituent university of the UP system in 2002 with a goal to be a hub of knowledge generation and human resource training and development in Northern Luzon.

UP Baguio takes pride in its contribution in nurturing and developing innovative programs in the arts and sciences as it continues to develop the niche it has created over the past decades - Cordillera studies.

Vision

The University of the Philippines envisions itself as a leading regional and global university in an environment that sustains 21st century learning, knowledge creation, and public service for society and humanity. As a constituent of the University of the Philippines System, UP Baguio will sustain its lead position in the delivery of tertiary education in the North.

UP Baguio will continue to nurture and develop innovative programs in the arts and sciences. It will also continue to develop the niche it has created over the past decade in Cordillera Studies.

Mission

Our mission, therefore, as a unit of the UP system and as the leading institution of higher learning in Northern Luzon, is to spearhead the offering of the highest standard of education and to contribute to the overall upgrading of the quality of instruction in the region.

We seek to create an impact by informing our students with a regional perspective, while they are informed with a national and global outlook.

Objectives

Based on the vision, the mandate, and the mission of the university in knowledge creation and public service, four goals were derived:

1. To contribute to national development by building expertise in different fields through the developing and strengthening of academic programs and research policies;
2. To optimize the use of resources through adequate budgetary and policy support, alumni support, and innovation of resource generation;
3. To promote equity amidst diversity in the efforts to achieving excellence and internationalization; and
4. To strengthen and enhance human resource management and promotion systems for the improvement of the welfare of constituents.

ABOUT THE COLLEGE OF SCIENCE

Subsequent to the reorganization of UP Baguio after its institution as the 7th constituent university of the UP system in 2002, the College of Science (CS), being one of the three colleges emerging from the reorganization, evolved from the merger of the Division of Natural Sciences and Mathematics and the Sports, Physical Education and Recreation Division.

The College offers four undergraduate programs, such as the BS Mathematics, BS Biology, BS Computer Science, BS Physics, and three graduate degree programs, namely, Master of Science in Conservation and Restoration Ecology (MS CaRE), Master of Science in Mathematics, and Doctor of Philosophy in Mathematics. All of these programs are regularly reviewed and upgraded to prepare students for careers in education, research, and/or postgraduate studies.

Vision

The College of Science aims to continue offering high standard and relevant quality education through good practices in program implementation that follows innovative pedagogical strategies that utilizes appropriate technology in supporting this endeavor.

It will further its objectives by initiating interdisciplinary programs anchored on disciplinary specializations in its efforts to enhance efficiency of research conduct and management.

It will continue to encourage and reward scientific productivity by conducting researches responsive to the needs of the region, nation and the global community.

The college envisions itself moving towards a more inclusive and equitable environment that enables faculty members to lead on with exemplary qualifications – mindful of scholarly research and dedicated to public service.

Furthermore, it will support UP Baguio's wellness program for both academic and support staff to guarantee efficiency in service to the university and the society.

Lastly, the college, together with the university, will take initiative to continue, strengthen and widen the reach of its involvement in public service by sharing individual and collective expertise with other academic institutions, local government units, Non-Government Organizations (NGOs), peoples' organizations and indigenous communities in the region and other areas.

Mission

In line with the vision of the College, it is our mission, therefore, to produce scientific leaders and civic-minded citizens with high regard for integrity, compassion, and genuine service who lead in research study that follows ethical standards and excellence in instruction, research and public service.

It is our mission to improve on basic facilities and design where researchers can work more collaboratively and efficiently.

We pursue to guarantee the safety of researchers, to minimize adverse impact to the environment, to respect research protocols involving indigenous communities, and to ensure professional conduct as we encourage good instruction, research and public service in upholding the University's banner of honor and excellence.

Objectives

In accordance to the mission and vision of the University, the college aims to accomplish the following objectives:

- I. To continue in formulating new degree programs while sustaining the old ones;
- II. To encourage interdisciplinary researches across programs;
- III. To institutionalize the Science Research Center (SRC) in continuing research responsive to the need of the region, and in the enhancement of interdisciplinary collaboration within the departments of the College and even with other faculty members in other Colleges of the UP Baguio;
- IV. To have a closer linkage with the UP Baguio Cordillera Studies Center (UP Baguio- CSC) as the University's research center and as an aide in putting up the Biodiversity and Innovation Research center;
- V. To foster an environment suitable for the growth of the academic and support staff; and,
- VI. To provide public service based on each academic and support staff's specialization.

ABOUT THE DEPARTMENT OF BIOLOGY

The Department of Biology emerged from being a Discipline under the then Division of Natural Sciences and Mathematics in 2002. Currently, it offers a Bachelor's degree in Biology, and a Master's degree in Conservation and Restoration Ecology (MS CaRE).

The Master of Science in Conservation and Restoration Ecology (MS CaRE) is a specialized graduate degree program that has grown out of the research, output, and experience of the Department of Biology over the years. The MS CaRE program covers multidisciplinary topics relevant to conservation and restoration such as ecosystems ecology, microbial ecology, disturbance ecology, ecophysiology, indigenous resource management, environmental laws, and environmental economics. The program is research-oriented and is designed for practitioners in the natural sciences, government planners, environment development officers, corporate social responsibility managers, managers of forest and marine reserves, and other stakeholders. Graduates of this degree program can potentially pursue careers in ecological and environmental monitoring and research, natural resource conservation and management, ecosystem restoration, and environmental consulting. They may also pursue PhD courses in related fields.

At the end of the program, graduates of MS CaRE are expected to be:

- competent environmental biologists who can lead and undertake projects in conservation, assessment, monitoring, and restoration of degraded ecosystems;
- trained to carry out research in conservation and restoration ecology; and
- ready to pursue Ph.D. courses in related fields.

Vision

Aligned with the goals of the College of Science and the University of the Philippines Baguio, the vision of the Department of Biology is to be a leader in academic excellence, research, and community involvement in Northern Luzon. We envision to be an active contributor to the university's commitment to deliver high-quality education by maintaining responsive curricula and instituting relevant academic programs integrating perspectives rooted in specific disciplines in biology. The department aspires for a more inclusive and equitable academic environment empowering teaching staff, personnel, and students to better engage in scholarly work, interdisciplinary research, and public service.

Mission

The Department of Biology commits to develop, adopt, and employ best practices in innovative pedagogies and technologies in scientific inquiry. We strive to generate knowledge through interdisciplinary research rooted in biology disciplines. We pursue a vibrant academic environment that produces researchers, professionals, and scientific leaders competent and equipped to responsibly and ethically address and manage environmental and health challenges. We extend our service to the public by sharing individual and collective expertise with various educational institutions, local government units, non-governmental organizations, peoples' organizations, and indigenous communities in the Cordillera Administrative Region and the rest of Northern Luzon.

COURSE DESCRIPTION AND REQUIREMENTS

About the Instructor

Faculty member in charge	Contact details
Roscinto Ian C. Lumbres, Ph.D. <i>PhD in Forestry – Forest Biometry and Modelling</i> Professorial Lecturer in Geographical Information Systems College of Forestry Benguet State University	Email address: ri.lumbres@bsu.edu.ph

Course Details

Course Number:	CRE 230
Course Title:	GIS and Mapping for Ecology
Course Description:	Students will be introduced to the basic concepts of geographic information systems (GIS), as well as to operational skills on data entry, data manipulation and analysis, and the production of interpretable output. The course will also allow students to understand the capabilities, uses, and limitations of GIS; apply appropriate GIS methods to solve a typical application problem; and be able to evaluate the results of data processing. Further, students will be made aware of organizational issues in GIS development and implementation. The course will consist of two parts: a theoretical aspect that will focus on the concepts, and a practical part that will develop skills in using tools (mostly software).
Prerequisite:	COI
Semester/s Offered:	
Course Credit:	3 units
Number of Hours:	2 hours lec, 3 hours lab
Course Schedule:	
Course Requirements:	

Lecture: 45%

Final Examination	20%
Written Examination	15%
Class Participation	10%

Laboratory: 35%

Supervised practical attendance	20%
Exercise Outputs	10%
Fieldwork	5%

Special Problem: 20%
Special Problem

20%

Program Learning Outcomes (PLOs)

The Program Learning Outcomes (PLO) of the MS CaRE Program are as follows:

PLO 1	To demonstrate genuine concern and passion for environmental issues that have impacts on species, ecosystems, and people
PLO 2	To practice professional and ethical integrity in diverse social and academic settings
PLO 3	To generate knowledge through independent transdisciplinary research
PLO 4	To communicate scientific outputs to key stakeholders and the general public
PLO 5	To assess ecological patterns and processes through rigorous and ethical scientific inquiry that supports evidence-based predictions for conservation and restoration decisions
PLO 6	To design a framework that can influence research and policies on the conservation and restoration of species, habitats, and ecosystems
PLO 7	To utilize immersive ground-truthing as a mechanism to ensure conservation and restoration interventions are both scientifically robust and socioculturally situated
PLO 8	To establish linkages with local communities, academia, non-government organizations, and government agencies in support of conservation and ecological restoration.
PLO 9	To integrate multidisciplinary approaches, local and indigenous knowledge systems, and community partnerships to consistently champion conservation and restoration across diverse ecosystems.
PLO 10	To adhere and commit to a life-long application of evolving ecological knowledge and collaborative practices to advance conservation and restoration efforts
PLO 11	To embody competence in ecological stewardship and sustainable resource management

Course Learning Outcomes (CLOs)

At the end of this course, the student should be able to:

CLO 1	Interpret and generate a map;
CLO 2	Explain the principles and use the vocabulary of GIS;
CLO 3	Learn and perform basic GIS operations (e.g., georeferencing, digitizing, geoprocessing, spatial analysis);
CLO 4	Collect field spatial data through a GPS receiver unit and integrate it into GIS;
CLO 5	Apply GIS methods for spatial problem solving in ecology; and
CLO 6	Cultivate awareness and develop an appreciation for the use of GIS and GPS as tools that could assist in decision-making about real-world problems.

Mapping of CLOs with PLOs

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
CLO 1		I	M	F	M	I				M	M
CLO 2					M				M	M	M
CLO 3		I	M	M	F	I			M	M	M
CLO 4		I	I	I	M	I	F		M	I	M
CLO 5	M	I	F	M	F	F	M		M	M	M
CLO 6	F		M		M	M	M		M	F	F

LEGEND: I-Introduced; M-Moderately achieved; F-Fully achieved

Class Rules

1. Students are allowed a maximum of three (3) absences or 20% of the total number of meetings for the entire semester; otherwise, the student will be required to drop the course (Article 346 of the University Code).
2. Students who miss class requirements will get a grade of zero unless their reasons are valid (with proper documentation). Make-up activities shall be given as soon as possible.
3. Students must actively participate in the class discussion.
4. Cheating, in any form, will warrant you a grade of 5.0 in this course or expulsion from the University. Declare and properly cite AI-generated content for course requirements to avoid plagiarism. Disclose the use of AI in data collection activities.

Grading Scheme

Grade	Equivalent	UP Classification	Grade	Equivalent	UP Classification
96 – 100	1.00	Excellent	65 – 69	2.75	Satisfactory
93 – 95	1.25	Excellent	60 – 64	3.00	Passing
89 – 92	1.50	Very Good	55 – 59	4.00	Conditional
85 – 88	1.75	Very Good	Below 55	5.00	Fail
80 – 84	2.00	Good	DRP		Dropped
75 – 79	2.25	Good	INC		Incomplete
70 – 74	2.50	Satisfactory			

Course Outline

TIMELINE	CLO	Topic	Teaching and Learning Activities	Assessment Tool
Weeks 1-2	CLO 2 CLO 6 CLO 1 CLO 2	I. GIS: An Overview (spatial thinking, history, basic features, applications, etc.) Laboratory: 1. Maps and Map Interpretation 2. Introduction to QGIS Browser or wxGIS if QGIS; Data Catalog if ILWIS <i>This section will provide an overview of the course and introduce the idea of thinking spatially. It will also present the history of GIS and provide an overall description of basic GIS features and applications.</i>	• Lectures • Practical exercises	• Class participation • Practical exercises
Weeks 3-4	CLO 2 CLO 2 CLO 3	II. Introduction to Spatial Data Laboratory: 3. Introduction to QGIS or Introduction to QGIS or ILWIS 4. Structuring Data 5. Geographic Phenomena <i>This section will introduce the different types of spatial data formats and how these are organized in a GIS environment. It will demonstrate how spatial data may be captured, stored, retrieved, displayed, manipulated, and analysed.</i>	• Lectures • Practical exercises	• Class participation • Practical exercises • Written examination

Week 5	CLO 1 CLO 2 CLO 6	III. Maps and Their Use in Ecology <i>Developments in digital spatial data handling have changed the environment where maps are produced and used; i.e., maps are no longer limited to the printed format. This section intends to provide a discussion of standard maps, their uses, and the basic skills necessary to take full advantage of these maps. The lectures will cover fundamental concepts underlying different mapping/analytical techniques, their strengths and limitations, as well as application settings.</i>	• Lectures	• Class participation • Written examination
Weeks 6-8	CLO 2 CLO 6 CLO 2 CLO 3	IV. Software Use Laboratory: 6. Tabular Data, Queries 7. Spatial Referencing <i>Students will be introduced to open-source software to introduce applications of GIS in thematic representation and analysis of change and spatial interrelationship of various geographical phenomena (including physical and cultural resources). The concepts of georeferencing and spatial information systems, geodatabase, digitising and editing, and geoprocessing will all be introduced.</i>	• Lectures • Practical exercises	• Class participation • Practical exercises • Written examination
Week 9	Reading and Wellness Break			

Week 16	CLO 2 CLO 6	VII. Special Problems in GIS and Applications in Ecology <i>Various applications of GIS in ecology and resource management will be discussed to expose students to the potential uses of GIS. This will lead them to develop their own special problems and address these using GIS.</i>	• Lectures • Practical exercises	• Class participation • Practical exercises • Written examination
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Teaching Methods/Strategies: lectures, exercises, field work, examination, special problem

Reference/ Reading List

(To be updated yearly)

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Arlinghaus, Sandra L., and Joseph J. Kerski. 2014. Spatial mathematics: theory and practice through mapping. <http://dx.doi.org/10.1201/b15049>.

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- Wang, Yeqiao. 2010. Remote sensing of coastal environments. Boca Raton, FL: CRC Press/Taylor & Francis. Chang, Kang-tsung. 2014. Introduction to Geographic Information Systems, 7th ed. Singapore: McGraw-Hill.
- ILWIS Tutorials
- QGIS Tutorials

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Prepared by: